Remarks

Claims 1, 3-16, 18-25, and 30-37 are currently pending. In the final Office Action of April 20, 2006, claims 30-37 were rejected under 35 U.S.C. §102(b) as being unpatentable over Studtmann (U.S. Patent No. 4,511,835). Applicant appreciates the Examiner's indication that claims 1, 3-16, and 18-25 are allowed.

Regarding the rejection of claims 30-37 under § 102(b) based on Studtmann, Applicant has amended the claims to clarify the invention and improve readability. In particular, Applicant amended claims 30 and 31 to improve the readability of the claims by specifying that the "reduction" was "in the AC power." Additionally, Applicant amended claim 30 to clarify that the controller is designed to monitor at least one of the input and the output of the rectifier to "identify a reduction in the AC power in excess of a threshold." Accordingly, as amended, claim 30 is clear that the controller acts "in response to identifying the reduction in the AC power in excess of the threshold" to "adjust a switching time of the at least one switch to control an amount of inrush current permitted upon a recovery of the AC power following the reduction in AC power in excess of the threshold."

The system called for in claim 30 is very different from the system taught by Studtmann for a number of reasons. In particular, Studtmann teaches the use of a simple comparator 104 that compares a "scaled-down" version of the DC bus voltage to a stored set point voltage supplied by the junction 97 to determine any variation in the DC bus voltage from the set point voltage and generate an error voltage proportional to the variation. *See* col. 9, ll. 20-35. The error voltage is then used by a rectifier controller 58 that automatically and reactively (i.e. without any analysis) adjusts the firing angles of the rectifier to attempt to maintain a steady state voltage amplitude along the DC bus. *See* col. 9, ll. 30-62.

One of ordinary skill in the art, given the guidance of the present application, would readily recognize that, although Studtmann is designed to maintain a steady state voltage amplitude along the DC bus, Studtmann teaches a system that would actually serve to exacerbate variations from a steady state voltage on the DC bus under the very conditions sought to be overcome by the present invention. That is, Studtmann teaches a system that is plagued by some of the drawbacks sought to be overcome in the present invention.

In particular, when a large drop in AC power supply to the rectifier is experienced, such as may occur during a substantial fault, Studtmann identifies a drop in the DC bus

voltage and attempts to maintain the steady state amplitude level on the DC bus by closing the switches of the rectifier. As the fault persists and the DC bus voltage continues to drop, the switches are held closed. When the fault is corrected and AC power is again being delivered to the rectifier, these switches will remain closed while the DC bus voltage approaches the set voltage. However, as identified in the Background section of the present application, this will result in a substantial inrush current.

The resulting voltage spike experienced on the DC bus will generate a substantial error voltage and cause the comparator 104 to open the switches of the rectifier in an attempt to drop the amplitude on the DC bus back toward the steady state set point and reduce the error voltage. However, in the case of a massive voltage spike experienced as result of a substantial inrush current, the controller will cause the switches of the rectifier to remain open for an extended period of time as the voltage spike is reduced towards the steady state amplitude. Unfortunately, since the controller simply reacts to an error voltage, the switches will not be opened until the error voltage is minimized. As such, the voltage applied to the DC bus will undoubtedly drop below the desired set point, which will cause the controller to hold the switches closed to compensate for the resulting drop in voltage below the set point, causing another voltage spike. This cyclical fight by the controller to react to peaks and valleys in the voltage applied to the DC bus will continue for quite some time in the case of a large inrush current resulting from an extended fault.

On the other hand, the system called for in claim 30 includes a controller that is designed to avoid or at least reduce the consequences of such faults by removing the controller propensity to overcompensate for faults. In particular, the claimed invention 1) reviews (directly or indirectly) the AC power delivered to the rectifier to identify potential faults (as opposed to simply monitoring the amplitude of the voltage on the DC bus), and 2) uses objective criteria to identify faults and control the amount of inrush current permitted upon correction of the fault (as opposed to simply reacting to every change in bus voltage regardless of size, duration, etc.). Thus, the controller of the present invention is kept from attempting to overcompensate for drops (or spikes) in occurring along the DC bus by monitoring (directly or indirectly) the AC power delivered to the rectifier and adjusting the switching times of the switches in the rectifier to limit inrush currents only upon detecting a drop in AC power beyond a specific threshold.

The intelligence of the claimed system is further exemplified within the dependent claims, for example claim 33, which in part calls for the voltage indicative of a recovery

to be at least three quarters of the voltage prior to the reduction in the AC power. Though not addressed in the final Office Action, claim 33 further illustrates how the claimed invention is designed to overcome the propensity of systems such as those taught by Studtmann that often overreact to variations in the power supplied or delivered and; thus, tend to exacerbate the consequences for faults.

Finally, Applicant has amended claim 37 to clarify the claimed invention by calling for the controller to "move the switching-on time in a nonlinear progression towards the normal switching-on time to maintain a current delivered at the output below a threshold." Though Applicant acknowledges the Examiner's position that, prior to amendment, Studtmann could be interpreted to teach that the movement of the switching-on time was at least one of linear and nonlinear, Applicant now asserts that Studtmann fails to teach that the movement of any switching-on time is a nonlinear progression, as called for in claim 37.

For at least these reasons, Applicant believes that claims 30-37 are patentably distinct from the art of record. Hence, the present application is in condition for allowance and timely issuance of a Notice of Allowance is respectfully requested. However, should the Examiner disagree with the allowability of the present application, the Examiner is cordially invited to contact the undersigned at the telephone number appearing below so that Applicant will fully understand any additional prosecution that the Examiner believes is necessary.

Though no fee is believed necessary as a result of this communication, the Commissioner is hereby authorized to deduct any fees arising as result of this or any other communication in the present application form deposit account no. 17-0055.

Respectfully submitted,

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